THE LARVA OF NOLA MINUSCULA.

BY HARRISON G. DYAR, YOSEMITE, CAL.

NOLA MINUSCULA Zeller.

1872. Zeller, Verhandl. d. k. k. zool.-bot. gesellsch., v. 22, 455.

Var. FUSCULA Grote.

1881. Grote, Papilio, v. 1, 76.

1887. Butler, Ent. amer., v. 3, 120. *pr. var.*

1887. Grote, Ent. amer., v. 3, 147. *pr. var.*

The larva of this species probably has six stages, five of which I have observed.

Egg. The eggs as taken from the body of a ♀ moth are spheroidal, much flattened at base, apparently covered with large contiguous depressions; color uniform pale green; diameter about 0.33 mm.

First larval stage. Not observed.

Second stage. Head, cervical shield and anal plate black; width of the first 0.25 mm. Body thick and plump, not different in structure from that of the mature larva, the warts small, dark brown, bearing three or four rather short blackish hairs. Color pale whitish, with a broad diffuse brown subdorsal shade.

Third stage. The head is now pale brown with black ocelli; width 0.3 mm. The body is as before but the brown subdorsal band is more distinct.

Fourth stage. Head brown, the ocelli and mouth darker brown; width 0.5 mm. Otherwise much as in the next stage but the markings less distinct.

Fifth stage. Head small, round, pale brown; width 0.7 mm. Body thick, somewhat flattened, tapering a little each way from the middle, with three rows of large, smooth, shining dark brown warts, the third row pale, bearing spreading, long, thin, white and blackish hairs. Row 1 is subdorsal, two on each segment on joints 2–4, 2 lateral and 3 subventral with some very minute warts, 4 below. Cervical shield large, deep brown with a whitish dorsal line bisecting it. Color of body sordid white, a pair of broad deep brown subdorsal bands, somewhat irregular, narrow on joints 3 and 4 and connected by a transverse bar over the dorsum on joint 7 and sometimes also on joint 5. Length of larva 5 mm.

Sixth stage. Head as before; width 1 mm. Body wider than high, rounded, hardly tapering at all, feet as in Nola with only four pair of abdominal ones. Warts 1 very large, oblong as if of two coalesced, 2 and 3 also large, 4 very small, subventral. The color varies much in different examples but the ground color is nearly white or tinged with reddish, the body shaded with blackish brown more or less, having a double dorsal, two waved lateral and a straight substigmatal line of the ground color, or the black may be reduced to a few reddish streaks, but always on joints 3 and 4 is a patch of the ground color bordered by a waved subdorsal black line. Warts pale, except rows 1 and 2 on joints 5–12 which are cinnamon brown or partly blackish. Cervical shield deep shiny brown, bisected. In one the warts of row 3 are yellowish. Spiracles black. Hair of irregular length, but longest at the extremities, blackish.

Cocoon. Elliptical, opaque, sordid white, composed of white silk, quite tough and intermingled sparsely with the larval hairs. Dimensions 8×4 mm.

Pupa. Cylindrical, tapering each way from the middle but most posteriorly; abdomen rounded, no cremaster. Body, except the cases, covered with long, rather dense pile; color pale brown, paler on the cases. Length 6 mm.; width 1.7 mm. Duration of this stage 18 days.

Food plant. Willow (Salix). The larvae

live singly, eat only the parenchyma of the leaf from the under side and hide by day in dry curled leaves that adhere to the twigs or in some other place of concealment on the branch. In this habit they differ from other Nola larvae that I have met with, which do not hide and eat the leaf from the top side only.

Habitat. Texas (Zeller), Colorado (Grote), Santa Barbara and Ventura Counties, California. It will probably also be found in the intermediate territory in the cañons and arroyos where willows grow.

A Dipterous Parasite of the Toad.

In the Zoologischer anzeiger, jahrg. 14, no. 379, Dec. 14, '91, p. 453–455, Duncker describes an interesting case of parasitism. A number of common toads were found in the neighborhood of Kiel with their nares eaten out and their heads swollen in the buccal region. The animals moved about languidly holding their heads down and when kept in confinement rubbed their nares against the walls and floor of the terrarium "as if to relieve themselves of an itching sensation." One of the animals thus confined died and was soon afterwards found completely skeletonized. The moss in which it was buried contained many white fly larvae (8 mm. long, 2 mm. broad). These soon pupated and in about 4 weeks gave rise to more than 50 flies which proved to be *Lucilia sylvarum*. Duncker claims that the eggs or very young larvae are deposited in the nares of the toad. The larvae first eat their way backwards to the buccal region and finally devour all the soft parts of the animal, even the ligaments of the bones. He expressly states that it is not the weak and sickly toads which are selected by the flies, since he has found infected specimens that had just sloughed their skins and were to all appearances in good health. Furthermore none of the infected toads appeared to have been wounded.

HENRY WALTER BATES.

It is not in London alone that the death of Henry Walter Bates will be deplored. He was one of the four entomologists — Wallace, Weismann, and Fritz Müller being the others — who have most distinguished themselves in support of the derivative theory of organic life, and who have gained for it independent evidence from new fields of research with which their names will be indissolubly associated. With the exception of Weismann all are Europeans who gained their inspiration in Brazil, and it was there that Bates was first brought face to face with the most patent facts of mimicry.

The world has admired the unassuming attitude of Darwin and of Wallace, as well as their genius, and the same attitude may be claimed for Bates, whose striking contribution to the philosophy of mimicry was modestly hidden in a systematic essay on the butterflies of the Amazons, the title of which made no reference to the fact. Had it not been accompanied by colored plates specially illustrative of the theory there broached, and had it not appeared in the heat of the Darwinian uprise, it would have lain dormant for many a year. Yet he was the first in explanation of the facts to offer a theory worth a moment's consideration; it has since received no correction and no noteworthy modification, and stands today as clear and satisfactory a statement of the whole matter as has ever since been made.

Bates was born Feb. 8, 1825; at twenty-three he left for Brazil where he spent eleven years in collecting. On his return he published his Naturalist on the Amazons, which gained him the post of assistant secretary to the Geographical society, which he held until his death, Feb. 16, 1892. His systematic work was mainly in diurnal Lepidoptera and Coleoptera, especially the Carabidae, and, according to McLachlan, he left behind him an incomplete work on the classification of this family besides copious biological notes and